USSR/Engineering - Metal Cutting, May 52
Ceramic Materials

"Metal-Cutting Synthetic Stone - Mikrolit," Prof I. I. Kitaygorodskiy, Moscow Chemicotechnol Inst imeni D. I. Mendeleyev

"Priroda" Vol 41, No 5, pp 101-103

Briefly outlines principles of crystalloceramic technology and states that new metal-cutting stone, mikrolit, is superior to any known material obtained by methods of ceramic technology from inorg substances. Cutters made of mikrolit,

230T32

having hardness 92-93 R_C and heat resistance over 1,900°, permit cutting speed higher than 1,000 m/min, up to 2,000 m in some cases. Life of cutters amounts to 25 hrs.

230T32

KITAYGORODSKIY, I. I., PROF

KITAYGORODSKIY, I. I.

USSR/Chemistry - Foam Glass 1s Feb 52

"Microporous Foam Glass," I. I. Kitaygorodskiy, T. N. Keshishyan, Moscow Chem-Technol Inst imeni D. I. Mendeleyev

"Dok Ak Nauk SSSR" Vol LXXXII, No 4, pp 619,620

To obtain foam glass of a homogeneous microporous structure, gasifiers in the form of both true solns and water suspensions are introduced by wet milling the glass (broken plate glass) and the gasifier (Na_2CO_3, coke, or chalk). Wet milling the glass assures creation of films of silicic acid gel on the grains of powdered glass which then adsorbs the gasifier. In prepd the charge by using aq suspensions of coke and chalk, stabilization of the suspensions is achieved due to the partial leaching of the glass in the process of wet milling. Foam glass prepd by wet milling and heating at 700-775° is characterized by the following properties: min pore diam 3.5-7.5 microns; vol wt of microporous samples 0.33 - 0.70 g/cu cm; structure of pores: closed in foam glass from Na_2CO_3; closed and partially interconnected with coke; interconnected from chalk; compression strength 100 - 130 kg/sq cm.

PA 213T21

KITAYGORODSKIY, Isaak Il'ich.

Glass and crystal ceramics Moskva, Znanie, 1953. 23 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii, ser. 3, no. 60) (54-35188)

H39.V8 no. 60

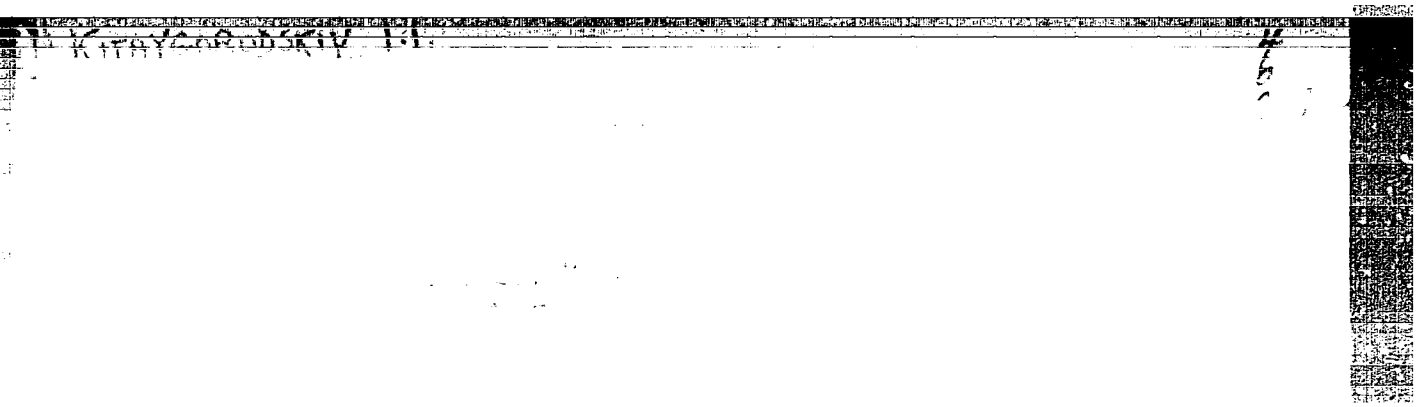
KITAYGORODSKIY, I.I.; KESHISHYAN, T.N.; SMIRNOVA, I.A., nauchnyy redaktor; OLENINOVA, I.L., redaktor; DVORNIKOVA, N.I., tekhnicheskiy redaktor

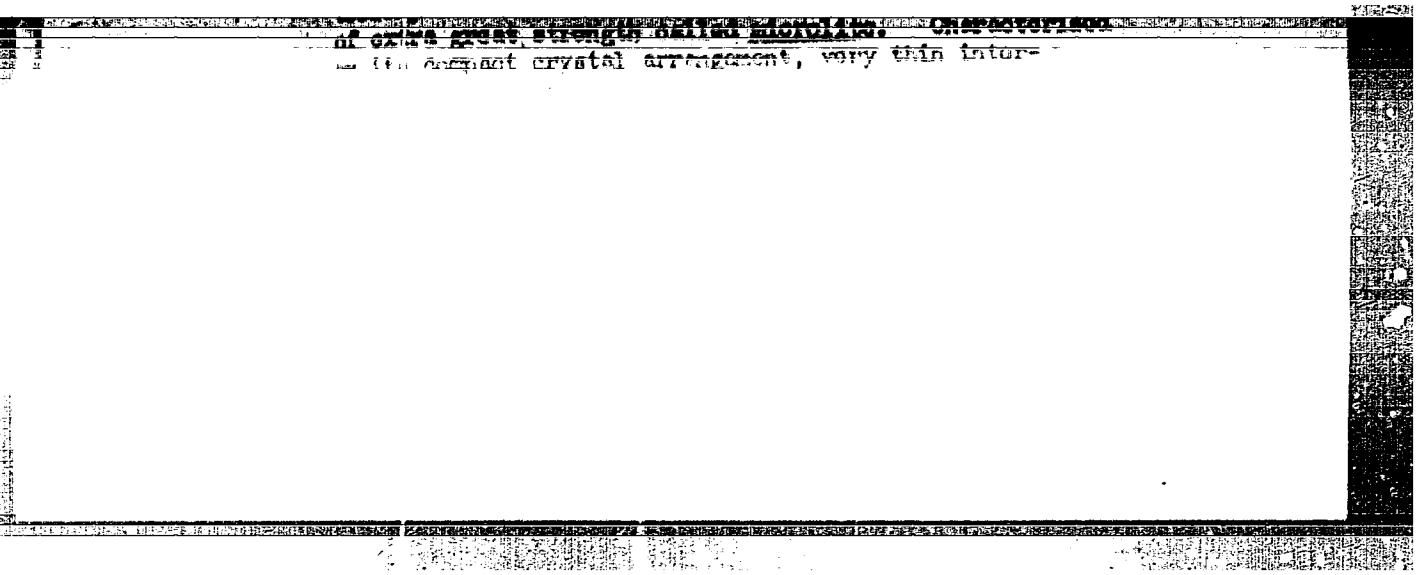
[Foam glass] Penosteklo. Moskva, Gos. izd-vo lit-ry po stroit. materialam, 1953. 77 p. [Microfilm] (MLRA 7:10)
(Glass)

KITAY GORODSKIY, I.I.

USSR.

Crystallization of industrial glasses. I. I. Kitaygorodskii. MT
(USSR).—The crystallite hypothesis of the constitution of glass (A. A. Lebedev and S. A. Reed-Rostovtsev) is taken as a fundamental starting point for the devitrification phenomena. Conditions for crystn. are particularly favorable in very large glass melts of modern tank furnaces, and the homogeneity in such melts is often rather doubtful. Even pockets with distinct temp. gradients are observed near the bridge, in which the devitrification takes place over relatively long time periods. The homogeneity can be improved and the factors which enhance local devitrifications eliminated by adequate construction of the throats, feeders, and stirring-machine elements, etc. Refractory bricks and linings in the furnace and its contacts or abrasion influence the production of high-quality glass. The most stable glass is one fd. 71.5, Al_2O_3 1.5-1.8, CaO 8.5, MgO 3.5, and Na_2O 14.8%. To study stones in glass, the petrographic-microscopic investigations of B. Frankin and his coworkers are used. plagioclase, gehlenite, augite, and $Ca_3P_2O_8$ were observed in the melt of peat coal ashes in gas producers in glass plants at 1100-1250° and in regenerative chambers. Cordierite (previously described as nephelite) in a BaO-contg. dolomite glass for radio tubes, was discovered by Belyankin and Lapin (cf. C.A. 43, 1740i), with characteristic inclusions of "β-corundum," mullite, spinel, and even aparite as a residue from the raw materials. W. Eitel





KITAYGORODSKIY, I.I.

GERM.

Structure of corundum "Microlites." I. I. Kitaigorodskii (D. I. Mendeleev Chem.-Technol. Inst., MOSCOW). *Doklady Akad. Nauk S.S.S.R.* 90, 213-6(1953); (cf. *C.A.* 48, 9044h.—The microstructure of Al_2O_3 ceramics (with 95% to 99% Al_2O_3, as of the type of the Bosch spark-plug insulators, and the Russian "Korrax") and of corundum inclusions, as in stainless-steel ingots, is compared with the structure of corundum refractories of the "Microlite" type, previously described by the author (*ibid.* 48, 553(1946); (*C.A.* 40, 6773; 41, 1403i; 44, 7500)). Electron-microscopic examn. shows polygonal aggregates of crystals of 1 to 3 μ diam., with a characteristic "terrace" surface sculpture. Between the corundum grains a glassy matrix in films of 10 to 100 mμ thickness is intercalated, which is removed by etching with HF. W. Eitel

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USSR/ Chemistry - Ceramics

Card 1/1 : Pub. 86 - 12/34

Authors : Kitaygorodskiy, I. I., Professor

Title : Microlite

Periodical : Priroda 1, 85-88, Jan 1954

Abstract : The development, in 1950, of a new corundum ceramic material, called corundum microlite, the strength of which exceeds any of the known ceramic materials, is reported. The new microlite soon found broad application in industry as a metal-cutting material suitable for mechanical treatment of cast iron, steel and non-ferrous metals. The micro-structure of corundum microlite is characterized by its homogeneity and microscopically small dimensions of the crystalline phase. Drawing; illustrations.

Institution : The D. I. Mendeleyev Chemical Technological Institute, Moscow

Submitted : .....

KITAYGORODSKIY, I.I.

USSR/ Miscellaneous - Bibliography

Card 1/1 Pub. 104 - 12/12

Authors : Kitaygorodskiy, I.I.

Title : A useful book for glass industry workers

Periodical : Stek. i ker. 5, page 32, May 1954

Abstract : The editorial presents an abstract of N.V. Solomin's book, concerning, "The Production of Special, Highly-Qualitative Refractories for Glass Industry, Economization of Refractory Materials and Technological Problems of Glass Production."

Institution: .....

Submitted: .....

Kitaygorodskiy, I. I.

AID P - 1016

Subject : USSR/Chemistry

Card 1/1 Pub. 119 - 1/8

Author : Kitaygorodskiy, I. I. (Moscow)

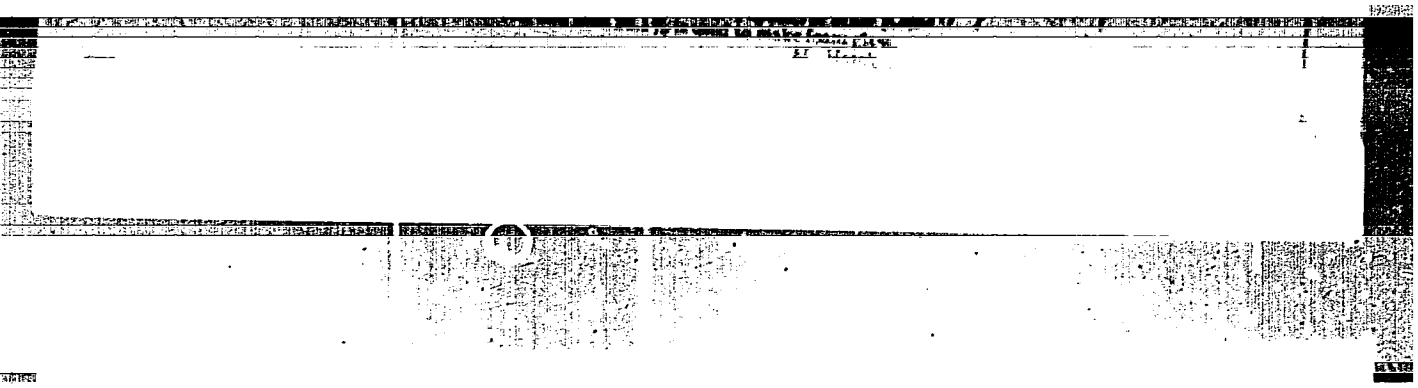
Title : Soviet glass manufacture and its immediate tasks

Periodical : Usp. khim., 23, no. 4, 401-425, 1954

Abstract : Review of various types of glass manufactured in the USSR. The work of Soviet scientists is emphasized. 43 references (38 Russian: 1898-1954).

Institution : None

Submitted : No date



APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722920006-3"

KITAYGORODSKIY, I.I.

USSR/ Chemistry - Glass manufacture

Card 1/1 Pub. 104 - 2/11

Authors : Kitaygorodskiy, I. I., Prof. Dr. of Tech. Sc.; Keshishyan, T. N.; and Vershal, B. U.

Title : Crystallization properties of window glass and its dependence upon the value of the alumo-magnesia coefficient

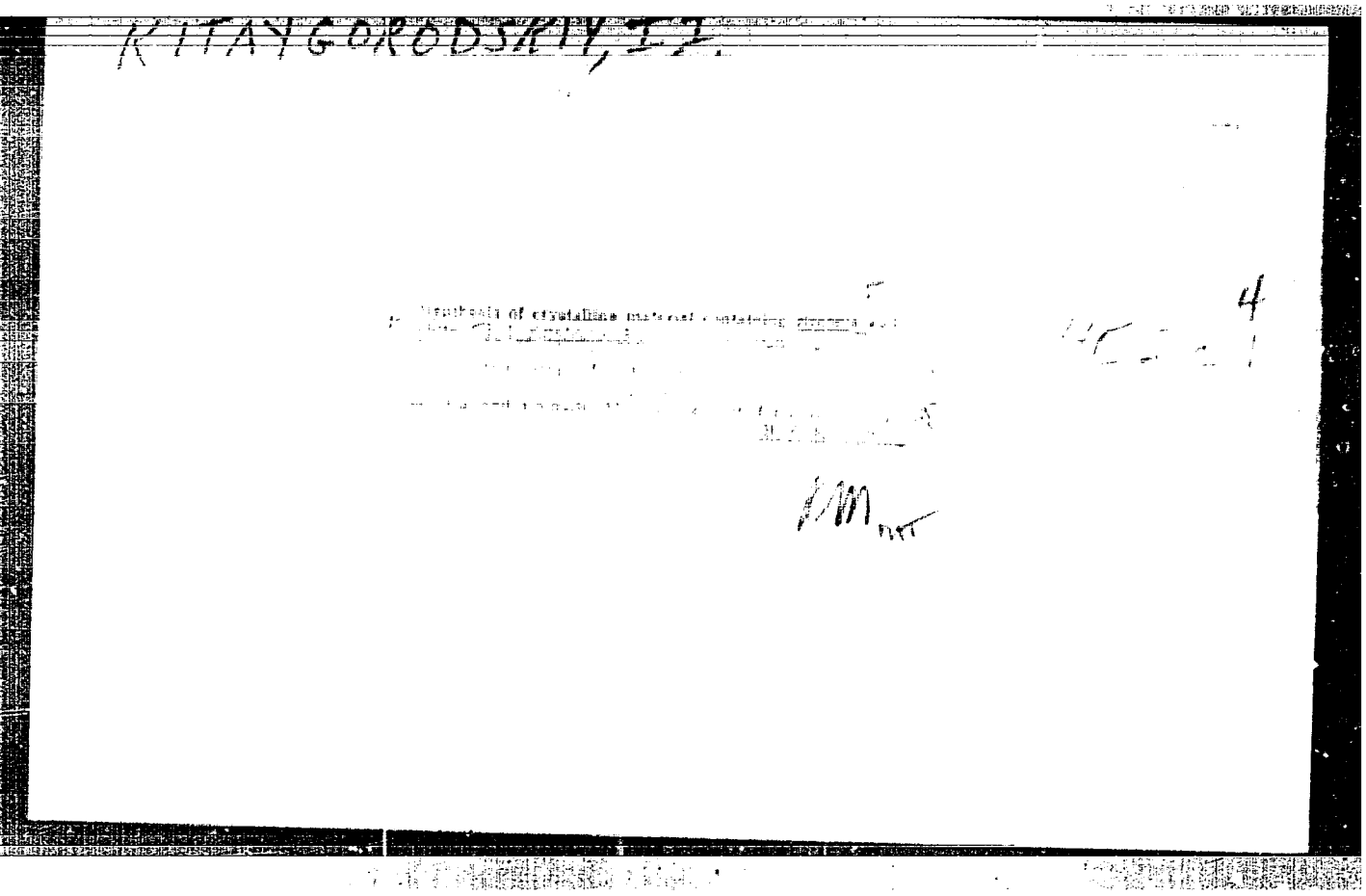
Periodical : Stek. i ker. 12, 4 - 5, Feb 1955

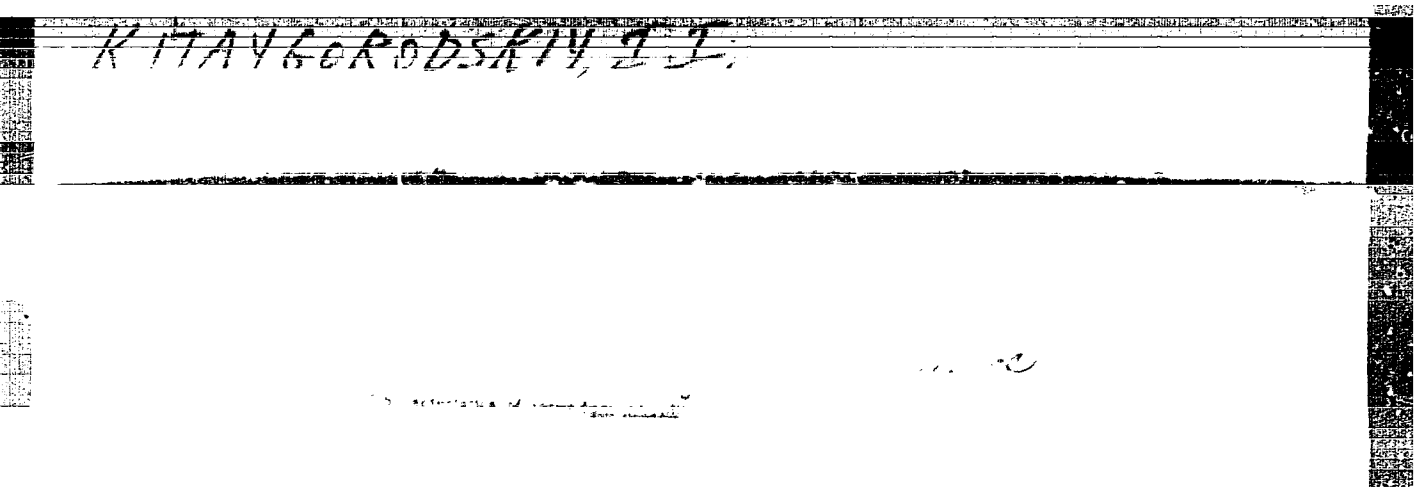
Abstract : Experiments were conducted to determine the change in the crystallization characteristics of window glass due to the change in the chemical composition of alumo-magnesia glass. The results obtained are given in tables and graph. A comparison of the results showed that glass with an alumo-magnesia coefficient of $K_{\frac{A}{M}}$ = 0.330 - 0.500 possesses the minimum rate of crystallization and a very narrow temperatureinterval of crystallization. Two USSR references (1939 - 1952). Tables; graph.

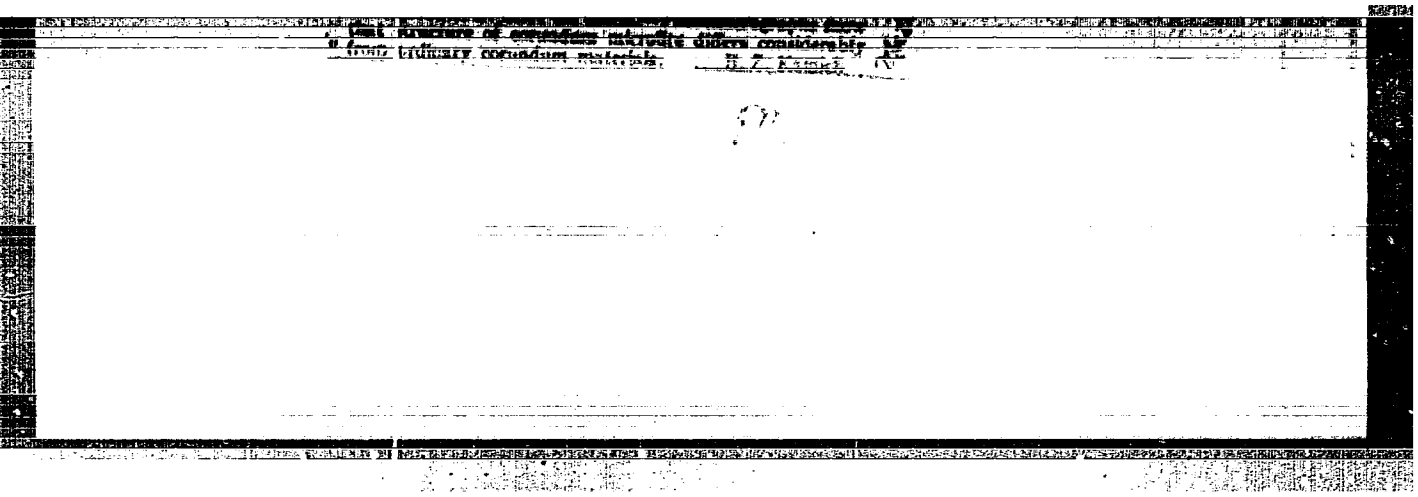
Institution: .....

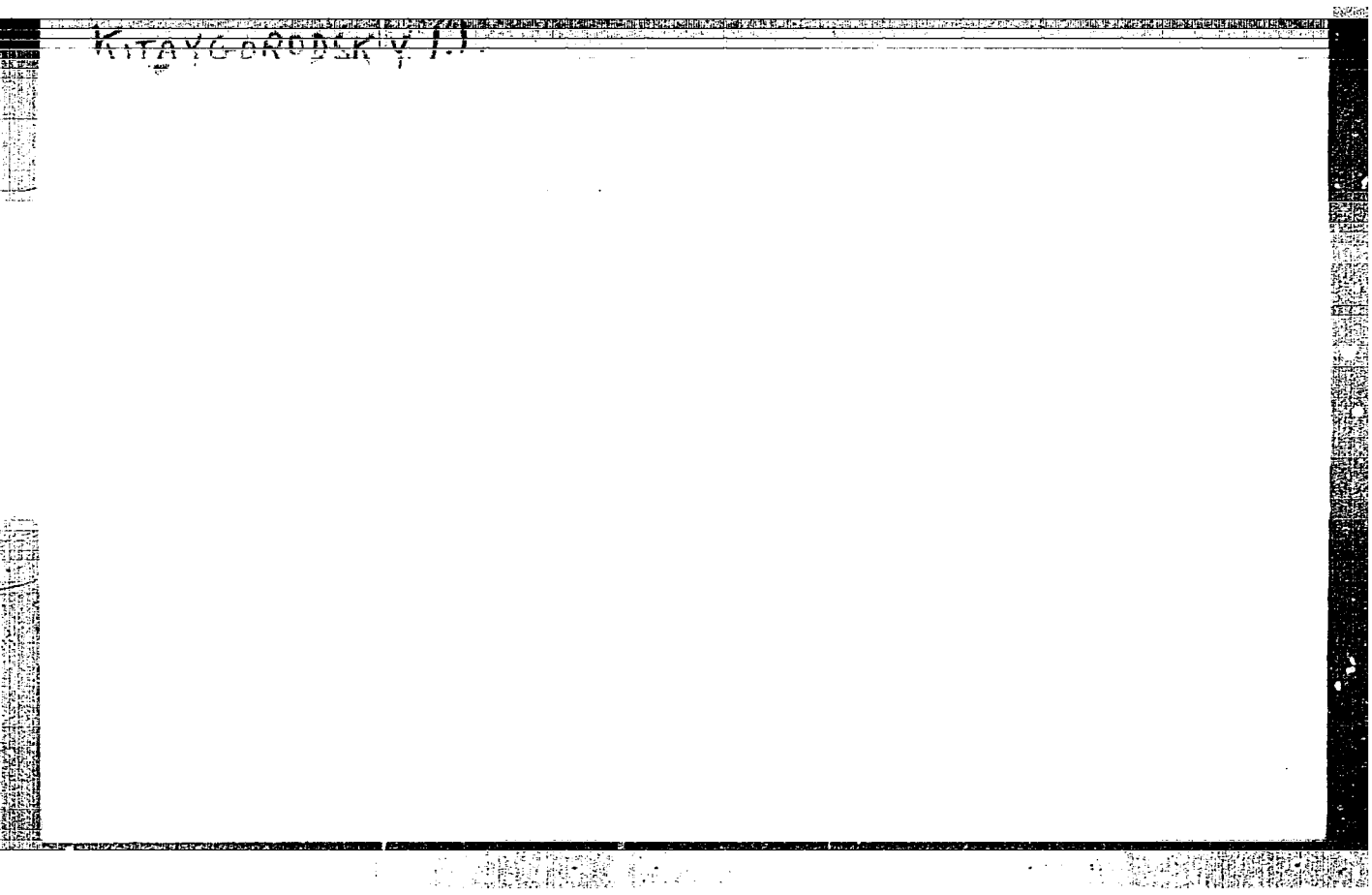
Submitted: .....

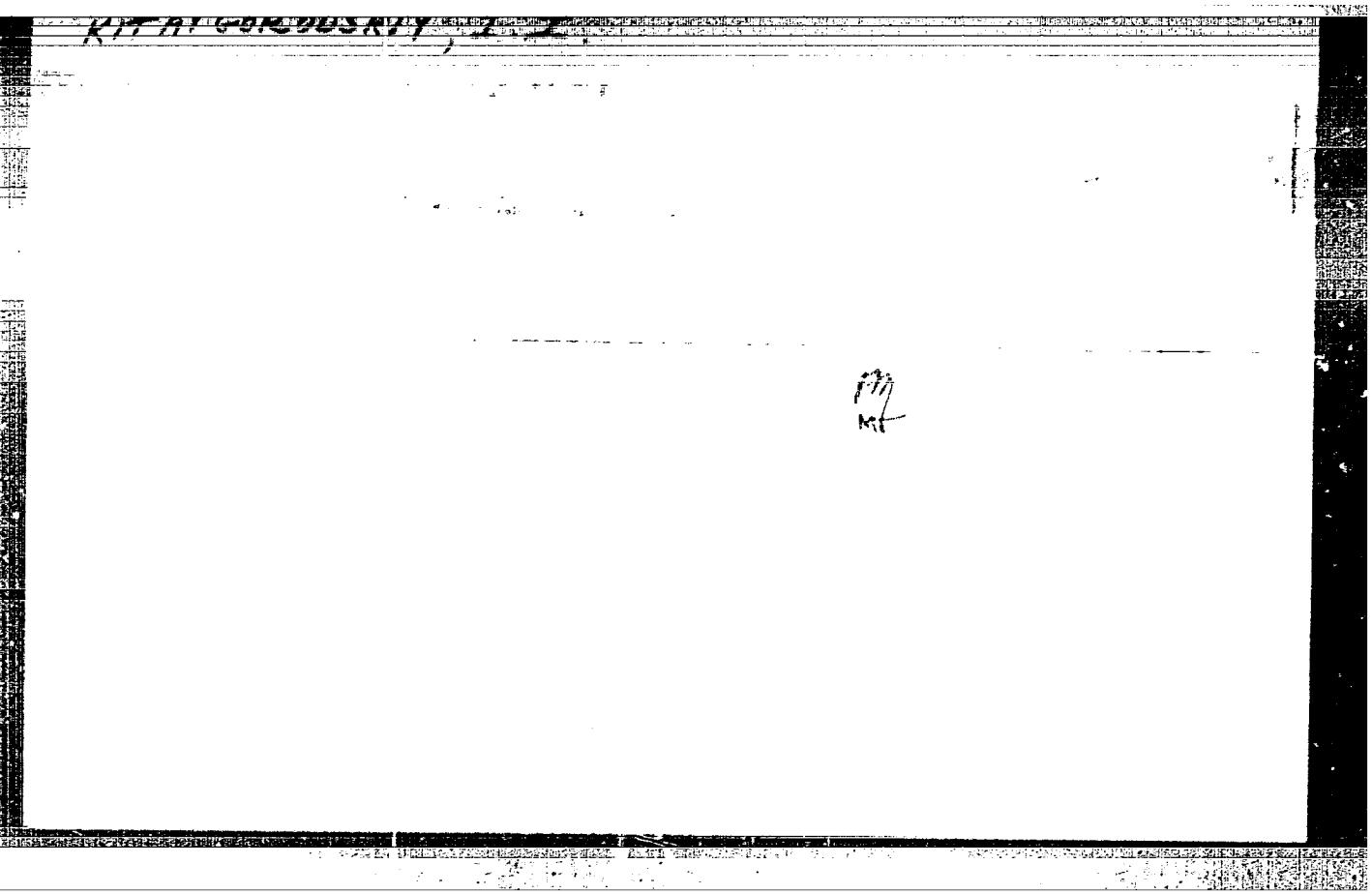
KITAYGORODSKIY, I. I.







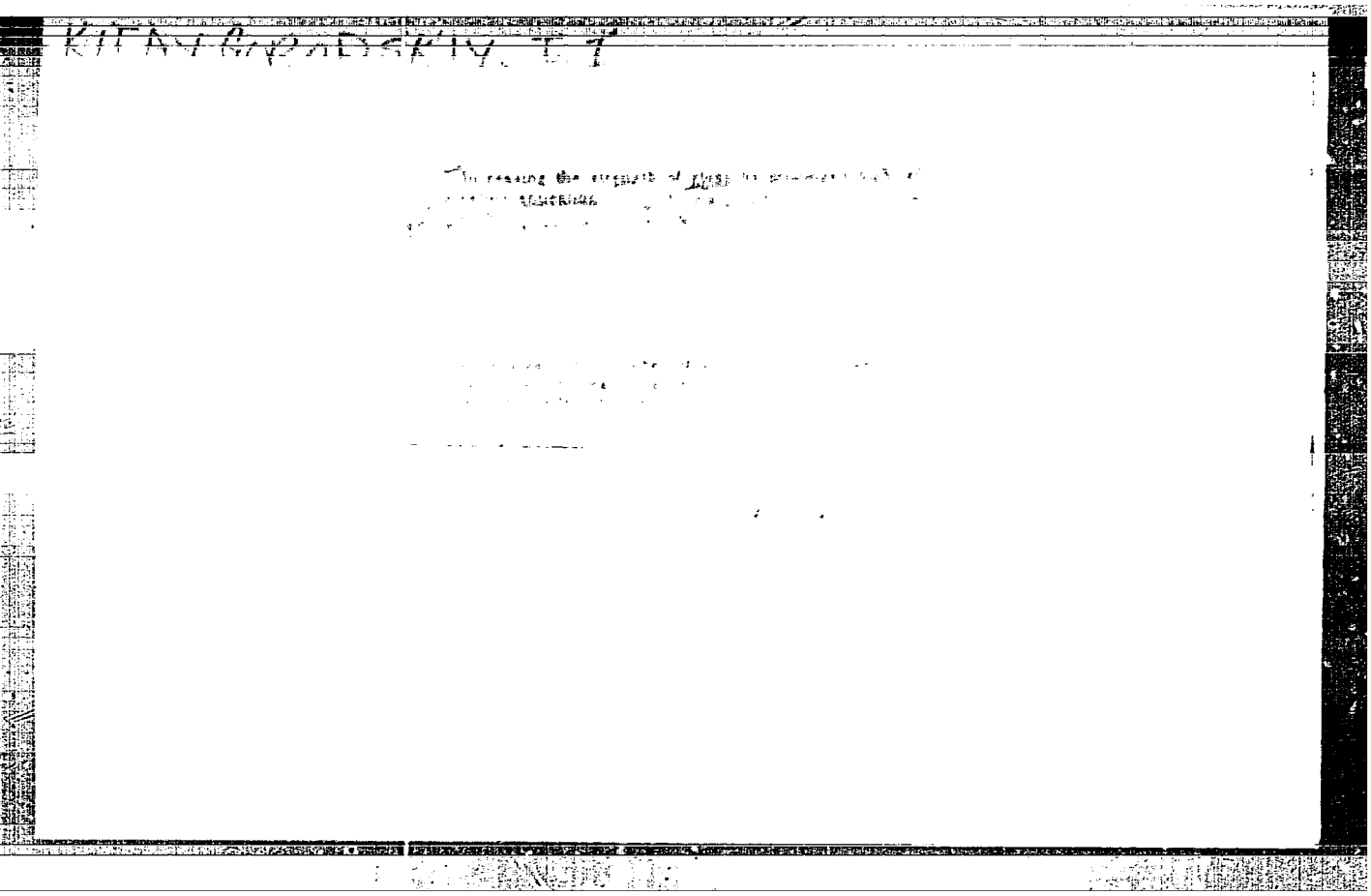


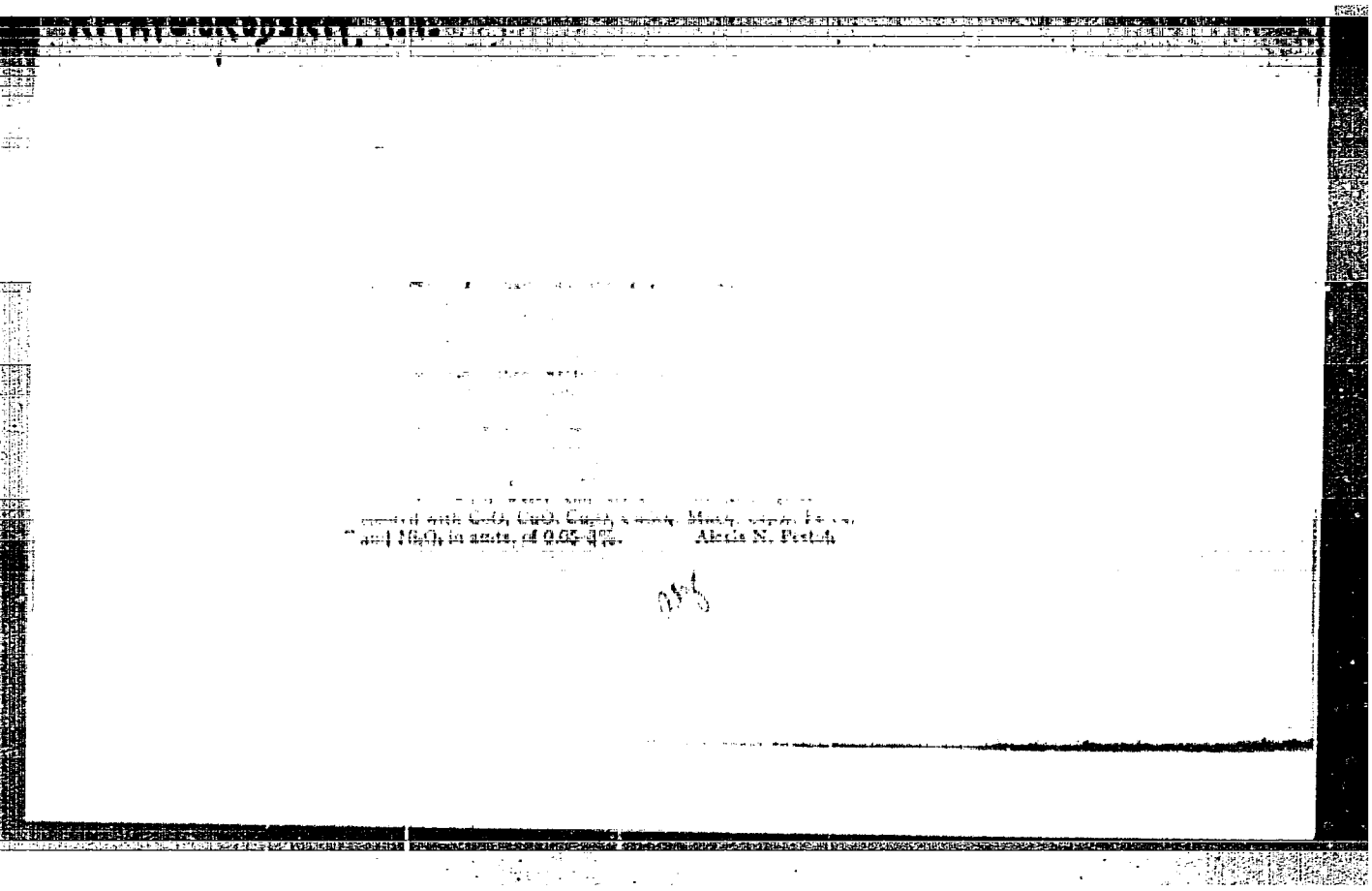


KITAYGORODSKIY, I. I., professor, doktor tekhnicheskikh nauk;
ZHITOMIRSKAYA, E., kandidat tekhnicheskikh nauk.

Foam glass in building. Stroitel' no.12:18 D '56. (MLRA 10:2)

(Glass, Cellular)





KITAYGORODSKIY, I.I., professor.

Fourth International Congress on Glass in Paris. Stek. i ker. 13 no.10: 7-9 O '56. (MLRA 9:12)
(Paris--Glass--Congresses)

SOV/124-57-7-8506

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 7, p 156 (USSR)

AUTHORS: Kitaygorodskiy, I. I., Keshishyan, T. N., Berezhnoy, A. I.

TITLE: Method of Determination of the Maximum Deformation at the Moment of Failure and Young's Modulus of Elasticity of Glass Samples (Metod opredeleniya maksimal'noy deformatsii pri razrushenii i modulya Yunga obraztsov stekla)

PERIODICAL: Tr. Mosk. khim.-tekhnol. in-ta, 1956, Nr 21, pp 39-44

ABSTRACT: The authors describe a device for the measurement of the maximum deflection during the process of loading a bar in a bending test. The maximum (failure) deformation is assumed to serve as a measure of the elasticity of the glass; this is not clear, since this value does not depend on the elastic limit of the material but on its brittle fracture strength, and the latter depends on the size of the test specimen and the condition of its surface.

G. M. Bartenev

Card 1/1

KITAYGORODSKIY, I. I.

USSR/Chemical Technology - Chemical Products and Their Application. Silicates. Glass. Ceramics. Binders, I-9

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62253

Author: Kitaygorodskiy, I. I., Rishina, V. A.

Institution: None

Title: Preparation and Investigation of Glasses of the System Anorthite-Diopside-Rhodonite

Original Periodical: Tr. Mosk. khim.-tekhnol. in-ta, 1956, No 21, 61-68

Abstract: Study of a number of manganese-containing high alumina glasses. Temperature of glass fusion 1,450°. Crystallization tendency of the glasses was found to occur in the temperature interval 1,000-1,100°. Coefficient of linear expansion in the temperature interval 20-500° is $(39.2\text{-}50.2)10^{-7}$. Thermal stability 130-170°. Loss in weight on boiling in water 0.023-0.041%. The glasses are brown. The authors recommend for thermostable articles a glass having the composition (in %): SiO_2 55, Al_2O_3 11, CaO 12, MgO 7, MnO 10, BaO 4, Na_2O 1.

Card 1/1

USSR/Chemical Technology - Chemical Products and Their Application. Silicates. Glass. Ceramics. Binders, I-9

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62271

Author: Kitaygorodskiy, I. I., Keshishyan, T. N., Epelbaum, M. B.

Institution: None

Title: Effect of Heat Treatment of Mechanical Strength of Glass Fibers

Original Periodical: Tr. Mosk. khim.-tekhnol. in-ta, 1956, No 21, 67-73

Abstract: Different authors have found that strength of glass fibers (GF) decreases steadily with increasing temperature of their treatment. In this paper a study is presented of the effects of heat treatment of threads and tape made from GF, of alkali-free and alkaline composition, on their tensile strength, over a relatively wide temperature range (100-705°) and duration period (up to 12 hours). The investigations have led to the following conclusions. Change in strength following a heat treatment of GF, with all other conditions being equal, depends on the composition of the glass. Decrease in

Card 1/2

KITAYGORODSKIY, I. I.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1369
AUTHOR KITAJGORODSKIJ, I.I., INDENBOM, V.L.
TITLE The Solidification of Glass by Quenching.
PERIODICAL Dokl.Akad.Nauk, 108, fasc.5, 843-845 (1956)
Issued: 8 / 1956 reviewed: 10 / 1956

After the progress made in prewar years development within this field was only slow. The degree of hardening characterized by tensions in the central plane of a glass plate could not be increased beyond 0,7 and 0,3 with a glass thickness of 6 and 20 mm respectively in spite of complicated blowing devices. According to V.L.INDENBOM, Žurn.techn.fis, 24, 925 (1954) there is no difference between the theoretical and the technical boundary value of the degree of hardening. An exact computation for the dependence of the degree of hardening φ on the intensity of heat transfer characterized by the criterion of Biot (Bi = ha; h = relative coefficient of the emission of heat on the surface, a = half thickness of the plate) is possible by a formula $\varphi(\delta)$. Here δ denotes the first root on the equation δ tg δ = Bi. Accordingly, the limit value of hardening at Bi = ∞ is 0,617 and it is true that $\varphi_{max} = 1 - 2/\pi \sim 0{,}3634$ The above formula is illustrated by a diagram with dimensionless coordinates $\varphi = \varphi(Bi)$ and is compared with more recent experimental data. The degrees of hardening attained at present correspond to the value Bi ~ 5,3, and for a further increase of the degree of hardening by 15% the intensity of the heat transfer must be doubled. However, the possibilities for the solidification of glass need nerewith not yet

KITAYG...KIY, I.I., doktor tekhnicheskikh nauk, professor; ARTAMONOVA, E.V.

KS-16 and KS-18 types of heat resistant glass. Stek.i ker. 14 no.7:7-8 Jl '57. (MLRA 10:8)

(Glass research)

KITAYGORODSKIY, I.I., prof.; BLINOV, V.A.

Titanium glass as a dielectric material for capacitors. Stek.i ker. 14 no.8:4-7 Ag '57. (MIRA 10:10)
(Glass manufacture--Chemistry) (Dielectrics)

KITAYGORODSKIY, I.I., prof.

Department of glass technology in the Mendeleev Institute of chemical technology in Moscow. Stek. i ker. 14 no.11:23-24 N '57. (MIRA 10:12)
(Chemistry, Technical) (Glass)

KITAYGORODSKIY, I.I.; ARTAMONOVA, M.V.

Synthesis of thermally stable glass containing a large percentage of alumina. Trudy MKHTI no.24:261-278 '57. (MIRA 11:6)
(Glass)

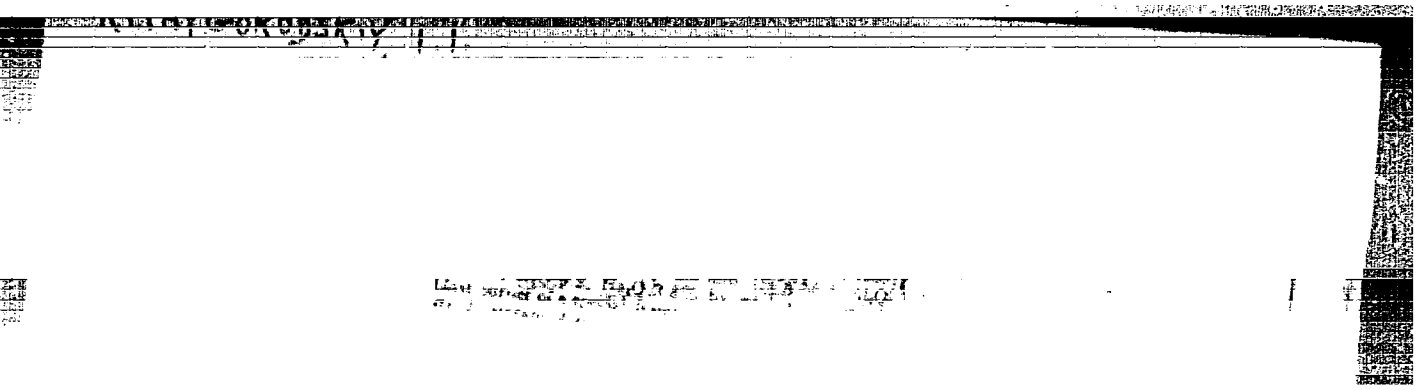
KITAYGORODSKIY, I.I.; BLINOV, V.A.

Thin glass films and their use. Trudy MKHTI no.24:314-317 '57.
(Glass manufacture) (MIRA 11:6)

KITAYGORODSKIY, I.I.; RISHINA, V.A.; SHEVTURIN, O.O.

Production of foam glass from low-melting clays. Trudy MKHTI no.24:318-323 '57. (MIRA 11:6)

(Glass, Cellular)



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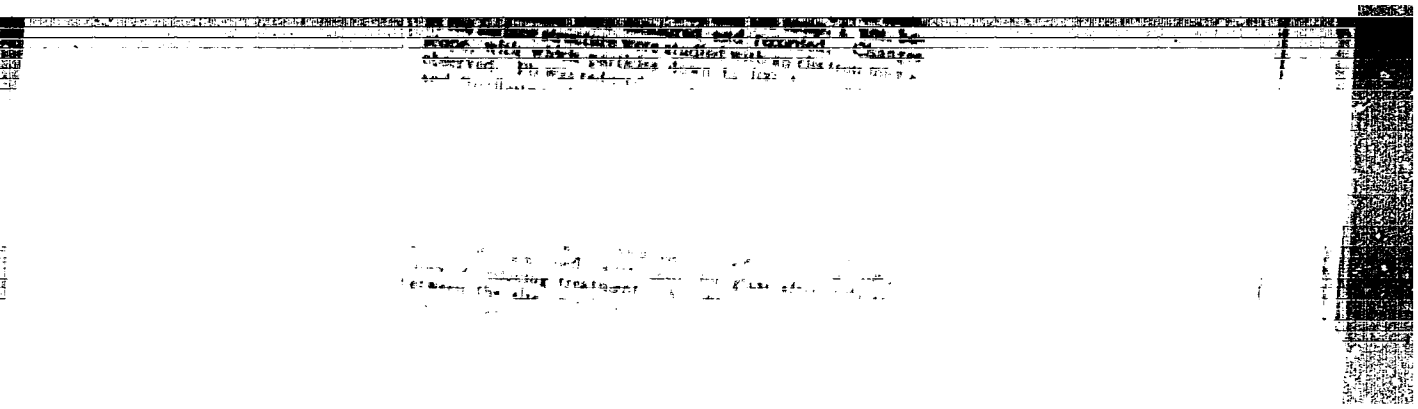

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KITAYGORODSKIY, I.I., doktor tekhn. nauk, prof.; ZHITOMIRSKAYA, B.Z.; ARCHAKOVA, E.A.; MIKHAYLOVA-BOGDANSKAYA, Z.A.; BARINOVA, A.P.

Investigating methods of reducing the volumetric weight of foam glass. Trudy VNIIStekla no.37:3-11 '57. (MIRA 11:1)
(Glass, Cellular)

Card 1/3

or symmetry of revolution. Formulae for the [illegible] -difference are given. An allegedmistake made by J. H. Adams

The Internal Stresses in Hard Glasses 20-2-17/60

and E. D. Williams is shown. The results found here for the cylinder and for the sphere are compared in two diagrams with the corresponding experimental results and are found to be in satisfactory agreement. In the cylinder the distance between the neutral zones is equal to the radius; the absolute amount of the phase difference in the domains with compression and expansion is equal. By investigations of the stresses in samples of different glasses which were quenched in oil-baths the authors determined the following: Internal expansion--stresses up to 30 - 32 kg/mm^2 do not yet cause a destruction of the glass. This value is about 4 times as high as the limit of stability of the glass in the case of extension. Further the amount of stresses on the surface of the glass can be determined from the average double refraction which was observed

The Internal Stresses in Hard Glasses

ASSOCIATION: Moscow Chemical and Technological Institute imeni D. I. Mendeleyev (Moskovskiy khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva)

PRESENTED: August 2, 1956, by P. A. Rebinder, Academician

SUBMITTED: July 4, 1956

AVAILABLE: Library of Congress

Card 3/3

AUTHORS: Kitaygorodskiy, I. I., Keshishyan, T. N., Paynberg, Ye. A. 72-58-3-1/15

TITLE: Investigation of the Types of Glass in the System SiO_2-$-Al_2O_3$-B_2O_3-BaO (Issledovaniye stekol v sisteme SiO_2-Al_2O_3-$-B_2O_3$-BaO)

PERIODICAL: Steklo i Keramika, 1958, Nr 3, pp. 1-5 (USSR)

ABSTRACT: This system has not yet been thoroughly investigated. A series of synthetically produced glass-compositions in this system, the major part of which refers to the field of heavy barium-chromates with a high barium-oxide content (45 to 55%), is shown in technical literature. Vargin and Kefeli investigated the reaction of silicate-formation in the layer of heavy barium chromate C-24. Data on the measurements of viscosity of these types of glass, as well as a description of their melting under operating-conditions are equally available. A series of works is devoted to an increase in the chemical stability of the heavy barium chromates. 6 types of glass which were synthetically manufactured in this

Card 1/4

system, are given in the work by Navias and Grin (table 1). In view of determining the ranges of glass-formation in this system, the authors selected 3 variants with a constant Al_2O_3- content of 10, 20 and 30%, in which case the compositions of glass are given in molecular per cent. The quantity of SiO_2 was changed from 20 to 70%, that of B_2O_3 from 10 to 60%. The glass-compositions are seen in table 2. Moreover, the composition of the layers and the melting are fully described. All types of glass were melted simultaneously in a furnace with oil-heating, according to a severe regime of temperature, as given in the table, in which case crucibles of corundum - from the Khar'kov-works for refractory products - were used. The control was effected by means of a binocular microscope MBS-1. The viscosity of the glass types was measured according to the method by Inglish and its values within the temperature-range of from 550 to 800°C are given in table 3. The dependence of the temperature on the chemical composition of certain types of glass is shown in figures 1 and 2. The linear coefficient of expansion was measured by means of the quartz-dilatometer VNIIS and the results are given in table 4. The dependence

Investigation of the Types of Glass in the System SiO_2-Al_2O_3-B_2O_3-BaO

of the coefficient of expansion on certain glass-compositions is seen from figures 3, 4 and 5, whereas the diagram of equal coefficients of expansion is given in figure 6. The electrophysical properties of the various alkalifree types of glass were also investigated from which it may be concluded that these types of glass should be of great interest for the electro-vacuum-industry. The same types may also be recommended as insulators of high quality on account of their high electric resistance. Furthermore, the various figures are explained in detail. Conclusions:

1) The range of glass-formation in the section of the system up to 30 molecular% Al_2O_3 was investigated and compositions were discovered which form glass at 1450° and 1550°C.
2) The inclination of the types of glass for crystallisation was investigated and the constant compositions determined.
3) The problem of the state of boranhydride in the investigated types of glass was dealt with.
4) The found values of the investigated types of glass allow to recommend their use in some fields of electro-vacuum--engineering. There are 6 figures, 3 tables.

Investigation of the Types of Glass in the System SiO_2-Al_2O_3-B_2O_3-BaO 72-58-3-1/15

ASSOCIATION: MKhTI imeni D. I. Mendeleyeva (MKhTI imeni D. I. Mendeleyev)

1. Metal oxides--Silicon dioxide systems--Chemical analysis
2. Glass--Analysis

Card 4/4

SOV/72-58-10-5/18

AUTHORS: Kitaygorodskiy, I. I., Professor, Matveyev, M. A., Sent'urin, G. G., Yagodina, A. T.

TITLE: Binder for Building Material Made From "Foam-Glass" (Vyazhushchiy material dlya stroitel'nykh izdeliy iz penostekla)

PERIODICAL: Steklo i keramika, 1958, Nr 10, pp 22-25 (USSR)

ABSTRACT: Investigations of various binders for "foam-glass" on the basis of liquid glass and caustic magnesite, respectively, as well as of an aqueous solution of magnesium chloride were carried out. Table 1 shows the composition of binders on the basis of liquid glass and table 2 that of those on the basis of caustic magnesite. From among the properties of the binders the setting time, mechanic stability, water tightness, and the coefficient of thermal expansion (by means of the dilatometer according to Botvinkin-Solomin) and the adhesion were determined. The characteristics of properties of the investigated binders can be seen from tables 3 and 4. The binders on the basis of liquid glass proved to be insufficiently watertight. From among the mag-

Card 1/2

nesite binders, those with a content of 45 % caustic magnesite, 25 % marshallite, 4,5 % asbestos, 25 % talc gave satisfactory results. There are 4 tables.

SOV/72-58-11-6/15

AUTHORS: Kitaygorodskiy, I. I., Sil'vestrovich, S. I., Chetverikova, L. N.

TITLE: Technical Stone From Glass Corundum (Tekhnicheskiy kamen' iz steklokorunda)

PERIODICAL: Steklo i keramika, 1958, Nr 11, pp 17 - 21 (USSR)

ABSTRACT: The synthesis of thick, sintered glass corundum was previously only carried out for the process of producing fire-resistant materials, as can be seen from the papers of I. I. Kitaygorodskiy, N. V. Solomin, A. I. Polinkovskaya, and S. F. Volchanov (Ref 1). In the work reported in this paper the authors used alkali-low and alkali-free aluminum-silicate glasses with high Al_2O_3 and MgO contents, whose positive influence upon the sintering and strengthening processes for ceramic materials was demonstrated in the paper by S. I. Sil'vestrovich (Ref 2). The chemical composition of the glasses and their characteristic properties are given in table 1. The gradation of grain sizes and the specific surface of the fine dispersion powder of the glass and the electrocorundum are given in table 2. The influence of the kind and amount of the glassy phase upon the degree

Card 1/2

KITAYGORODSKIY, I.I., prof.

Glass in ceramic materials. Khim. nauka i prom. 3 no.1:35-45 '58.
(Ceramics) (Glass) (MIRA 11:3)

AUTHORS: Kitaygorodskiy, I.I., Karpechenko, V.G. 72-58-6-4/19

TITLE: The Synthesis and Investigation of Some Types of Vanadium Glass (Sintez i issledovaniye nekotorykh vanadiyevykh stekol)

PERIODICAL: Steklo i Keramika, 1958, [illegible], Nr 6, pp. 8-10 (USSR)

ABSTRACT: On the 4. International Congress on Glass held in Paris (July 1956), Stanworth (Stenvort) and Rawson (Rouson) spoke about the synthesis of new types of glass obtained on the basis of oxides of the rare metals tellurium, vanadium, molybdenum, tungsten, titanium, tantalum and niobium. It must be considered a special feature of these systems that TeO_2, V_2O_5, MoO_3 and WO_3 cannot be obtained in a vitreous state, except by the addition of certain quantities of a second oxide, which may be selected either from the number of glass-forming (P_2O_5, As_2O_3, GeO_2) or from that of the modifying oxides (Na_2O, BaO, PbO etc.). The new compositions are of interest with respect to the structure of the glass as they have physical and chemical properties of practical value, viz. a particularly low electric resistance as well as some properties of semiconductors. The Chair of Technology of Glass MKhTI imeni D.I.Mendeleyev carried out research work in connection with types of glass on the

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basis of V_2O_5. On the strength of this work the ranges of glass formation in the systems V_2O_5 - P_2O_5-PbO (fig. 1) and V_2O_5-P_2O_5-WO_3 (fig. 2) were determined. The layers were composed of pure chemical reagents. All types of vanadium glass obtained are black, and their chemical stability is very low. The specific electric resistance was measured by means of the megohmmeter MOM-2 in the temperature interval of 20-200° (table 1). The dielectric constants of the types of glass were measured by means of a device of the type KV-1. The linear dilatation coefficient was measured by means of the quartz dilatometer of the Glass Institute in the temperature interval of 20-200° (fig.3 and table 2). Types of glass with a high V_2O_5 content are completely destroyed in cold water in that they form a stable solution. The highest degree of chemical stability is to be found with glass types having a high content of WO_3. Vanadium glasses are completely impervious to light for the visible part of the spectrum, but they allow infrared rays within range of a wavelength of about 4 μ to pass through them, which was found out by means of the infrared spectrometer IKS-11. The spectral curves are given in

KITAYGORODSKIY, I.I.

VLADISLAVEV, V.S.

18(1) PHASE I BOOK EXPLOITATION SOV/[illegible]

Spravochnik metallista v pyati tomakh, t. 3, kn. 1 (Metals Engineering Handbook in Five Volumes, Vol. 3, Bk. 1) Moscow, Mashgiz, 1958. [illegible] p. [illegible] copies printed.

Ed. (Title page): V.S. Vladislavlev, Professor (Deceased); Ed. (Inside book): V.I. Krylov, Engineer; Tech. Ed.: T.F. Sokolova; Editorial Board: N.S. Acherkan (Chairman and Chief Ed.), Doctor of Technical Sciences, Professor, V.S. Vladislavlev, Professor (Deceased), A.N. Malov, Candidate of Technical Sciences, S.N. Poznyakov, A.N. Rostovykh, G.A. Stolbin, and S.A. Chernavskiy; Managing Ed. for Reference Literature: V.I. Krylov, Engineer.

PURPOSE: The book is a reference book for technicians and engineers working in the field of machinery design and in production.

COVERAGE: The book covers the following: engineering specifications, treatment and use of cast iron, steel and carbides, heat treatment of steel and cast iron, specifications, treatment and use of nonferrous metals and nonmetallic materials. I.I. Kitaygorodskiy, V.P. [illegible], N.V. [illegible] are mentioned as having cooperated in the field.

Card 1/[illegible]

Glass (I.I. Kitaygorodskiy, Professor, Doctor of Technical Sciences) [illegible]

K. Tay[illegible] I. I

20-2-42/60

AUTHORS: Kitaygorodskiy, I. I., Blinov, V. A.

TITLE: "Pireksil" (Pyrexyl) Heat-Resistant Glass (Termostoykiye stekla "Pireksil")

PERIODCIAL: Doklady AN SSSR, 1958, Vol. 118, Nr 2, pp. 351 - 353 (USSR)

ABSTRACT: The authors give a survey of works whose aim is the synthesis of a glass which in its properties approaches quartz glass. They succeeded in producing a glass in the Chemical-Technological Institute Moscow (Moskovskiy khimiko-tekhnologicheskiy institut) which is close to "Vikor"-glass (references 1, 2), but which does not require any leaching of glass and no repeated heat-treatment. Further the problem of the influence exerted by the overrefined crushing of the mixture upon the melting process and upon the formation of glass is discussed. There exists no uniform opinion on this problem (references 3 - 5). Highly disperse quartz-sand and chemically pure materials were used for glass- melting. The melting lasted 6 - 8 hours at 1600 - 1650°C in an oxidizing medium. Boron--silicate-glass of the type "Pireks" (pyrex) was used as initial glass. B_2O_3 was gradually replaced by SiO_2 in the original composition during the synthesis of the new glass "Pireksil" (Pyrexyl). At a constant content of alkalies the content of silica amounted

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20-2-42/60

"Pireksil" (Pyrexyl) Heat-Resistant Glass

to 80 - 94 %. The composition of the individual series of galss is shown in table 1. The sand fraction from 20 to 1 μ yielded the best results. For glass melting on an industrial scale the authors recommend the compositions Nr 186, 192 and 212, which possess small moduli of extension (25.10^{-7}, $21.8.10^{-7}$ and $16,9.10^{-7}$). In the State Optical Institute imeni S. I. Vavilov (Gosudarstvennyy opticheskiy institut im. S. I. Vavilova) a semi-industrial melting of the glass KS-192 (KC-192 Russian) was carried out in a quartz container (80 l) at 1650°C in a high-frequency furnace. The obtained glass had a good quality. Finally moduli of extension of the glass-series I - IV are given (table 1). There are 1 table, and 5 references, 3 of which are Slavic.

PRESENTED: June 14, 1957, by I. P. Bardin, Academician

SUBMITTED: June 11, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Kitaygorodskiy, I.I., Blinov, V.A. SOV/20-121-6-31/45

TITLE: The Production of Super-Thin Film Glass and Its Fields of Application (Polucheniye sverkhtonkogo plenochnogo stekla i oblasti yego primeneniya)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 6, pp 1060 - 1062 (USSR)

ABSTRACT: Recently informations were published on the production of the glass mentioned in the title (Refs 1-3). These glass films are advised for the production of artificial mica, condensers, cover glasses and for other purposes. Since 1955 the authors have tried to organize a continuous production of super-thin glass films in form of an endless strip; these attempts were made at the kafedra tekhnologii stekla Moskovskogo khimiko-tekhnologicheskogo instituta im. D.I. Mendeleyeva (Chair of Glass Technology of the Moscow Chemical Technological Institute imeni D.I. Mendeleyev). After an investigation of the methods described in publications the method of extracting the melted glass vertically downward was chosen. It is widely applied in the production of glass fibers. Figure 1 shows a pattern of the furnace with a boat made of ceramics or plastin. Due to its own weight the fluid

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glass flows out through a split in the bottom of the boat. The strip forming by this method is wound up on a drum with varying velocity (according to the required thickness of the strip). A ceramic holder (bortoderzhetel') prevents a narrowing of the strip. The strip adheres to it and thus maintains its original breadth; it amounted from 2 - 100 mm. The length of the strip reached several dozens of meters as well as a uniform thickness of 5 - 50 μ. It is also possible to reach other thicknesses. The flexibility of the strip is determined by its super-thinness. It has the same electrophysical properties as the glass from which the strip was made. The composition of the glass is of great importance. Apart from the properties of the strip, table 1 shows the last of 4 types of glass. Artificial mica produced from it shows several advantages in comparison with mica (Table 2). This fact refers to the condensers produced of the strip. There are 1 figure, 2 tables, and 3 references.

The Production of Super-Thin Film Glass and Its Fields of Application

SOV/20-121-6-31/45

PRESENTED: April 24, 1958, by I.P. Bardin, Member, Academy of Sciences, USSR

SUBMITTED: April 23, 1958

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SOV/81-59-19-68582

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 19, p 300 (USSR)

AUTHORS: Kitaygorodskiy, I.I., Shirkevich, T.L.

TITLE: The Production of Alkali-Free Foam Glass

PERIODICAL: Steklo. Byul. Gos. n.-i. in-ta stekla, 1959, Nr 1 (101), pp 15 - 21

ABSTRACT: An investigation of the possibilities of obtaining foam glass on the base of three alkali-free glasses: M-519, M-519a, Nr 13v (the compositions are given in a table) has been carried out. Gas-forming agents: Na_2CO_3, $CaCO_3$-chalk, $CaCO_3$-marble, SiC, C-carbon black, Na_2SO_4, MnO_2. It has been confirmed that the behavior of the gas-forming agent, the character of foaming and the temperature interval of foaming strongly depend on the chemical composition and the properties of the initial glass. The M-519 and M-519a glasses with the gas-forming agent pyrolusite produce a foam glass with a partially connected structure. On the base of M-519a glass with carbon black as gas-forming agents a foam glass with closed structure can be obtained. MnO_2 can be used as gas-forming agent for producing foam glass not only at low but also at

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15(2) SOV/72-59-3-4/19

AUTHORS: Kitaygorodskiy, I. I., Bayburt, L. G., Zertsalova, I. N., Karpechenko, V. G., Paynberg, Ye. A.

TITLE: Investigation of the Possibility of Obtaining the "Vizhurit" Glass (Issledovaniye vozmozhnosti polucheniya stekla vizhurit)

PERIODICAL: Steklo i keramika, 1959, Nr 3, pp 12 - 13 (USSR)

ABSTRACT: The shatterproof glass presently manufactured has the defect of completely disintegrating into fragments, although not dangerous ones, when given a blow. It is however required in motor car traffic that on destruction of the glass at least a small part of it, the one in front of the driver's eyes, is left undamaged. In 1956 the authors of the present paper carried out investigations at the Gusevskiy zavod imeni Dzerzhinskogo (Gusev Factory imeni Dzerzhinskiy) for the purpose of obtaining a "Vizhurit" type glass, which is produced abroad by various patented processes. Experiments were made on the flat windshields of the "Moskvich" car (974 x 327 x 5.5 mm). The results obtained are shown in figures 1 and 2, but they are not regarded as satisfactory,

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as the glass, according to figure 2 burst after 10 - 15 days as a consequence of internal strains. These experiments must now be carried on. There are 2 figures.

ASSOCIATION: Gusevskiy zavod imeni Dzerzhinskogo (Gusevskiy Factory imeni Dzerzhinskiy)

15(2) SOV/72-59-5-2/23

AUTHORS: Kitaygorodskiy, I. I., Professor, Gurevich, Ts. N.

TITLE: Intensification of Alumina Pulverization in the Glass- and Ceramic Industry (Intensifikatsiya izmel'cheniya glinozema v stekol'noy i keramicheskoy promyshlennosti)

PERIODICAL: Steklo i keramika, 1959, Nr 5, pp 5 - 9 (USSR)

ABSTRACT: The working conditions of ball mills for alumina were investigated by the Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva (Moscow Institute of Chemical Technology imeni Mendeleyev). In connection herewith the authors of this article refer to papers by D. N. Poluboyarinov, V. L. Balkevich, G. A. Vydrik (footnote), D. N. Poluboyarinov, R. Ya. Popil'skiy, and T. V. Malikova (Ref 1). The authors of this article investigated the influence of the correlation of the weight of alumina and the dispersion medium, as well as of an active addition. The senior laboratory assistant Ye. I. Sysoyeva participated in these investigations (Ref 2). The authors rely on the works by Rebinder, P. A. Kalinkovskaya (Ref 3), and N. M. Lubman (Ref 4). The dispersion medium and the active addition were chosen by means of the Kuznetsov apparatus (see the papers by N. M. Pavlushkin,

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and G. G. Sentyurin in reference 5). The corundum hardness-reducing agents are described in table 1. Oleic acid and the aqueous sugar solution of 0.05% are indicated as being the best ones. The kinetics of alumina pulverization in various correlations of water and alumina is given in table 2; in this case the correlation of 0.875 proved to be the optimum one. Table 3 shows the kinetics of alumina pulverization with an addition of 0.1% sugar, and table 4 contains the results of experiments with the correlation 0.75 of water and alumina as well as with a sugar content of 0.05 and 0.15%. Conclusion: the time of pulverization could be reduced by almost 1/3 due to the determination of the optimum pulverization conditions. This grinding intensification is obtained with a correlation of 1 to 0.75 water and alumina and by a sugar addition of 0.1% of the weight of water. It can be increased by further more exact experiments. There are 4 tables and 5 Soviet references.

15(2)
AUTHORS: Kitaygorodskiy, I. I., Professor, Shirkevich, T. L.

SOV/72-59-10-2/14

TITLE: Some Properties of Alkali-free Foam Glass

PERIODICAL: Steklo i keramika, 1959, Nr 10, pp 5 - 6 (USSR)

ABSTRACT: The authors of this paper set themselves the task to obtain commercial foam glass from glass free of alkali and boron. In the findings of a previous investigation made by the authors (Footnote 1), the glass M-519 was recommended as initial material for the manufacture of alkali-free foam glass. Furthermore, some properties of alkali-free glass were investigated: compressive breaking strength, the coefficient of thermal expansion, temperature stability, the coefficients of temperature and thermal conductivity, and the average specific heat. A special paper will be devoted to the three last-mentioned properties, as may be seen from footnote 2. The experimental results are presented in the figure which shows the dependence of the compressive breaking strength on the weight by volume of the foam glass (Curve 1). The compressive strength of foam glass of the F brand of the Gomel' Glassworks is shown in curve 2, and the strength of some highly porous samples in curve 3. The coefficient of thermal expansion of the foam glass was measured on a quartz dilatometer of the design of the

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Some Properties of Alkali-free Foam Glass SOV/72-59-10-2/14

Instituta stekla (Glass Institute). Furthermore, the coefficients of thermal expansion of the glass M-519, as well as of the foam glass of the Gomel' Glassworks were determined and described for comparative purposes. Experiments are mentioned concerning the molding of foam glass at the laboratoriya stroitel'nogo stekla GIS (Laboratory for Building Glass GIS), which showed that boron-free foam glass made from the glass M-519 has a molding temperature over 780°, as against the temperature of 570-625° of the Gomel' foam glass. As a result of experiments, it was possible to obtain alkali- and boron-free foam glass from the glass M-519, which is recommended as heat-insulating material for temperatures of up to 500-600°. There is 1 figure.

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15(0) SOV/72-59-11-3/16

AUTHORS: Kitaygorodskiy, I. I., Professor, Artamonova, N. V.

TITLE: Heat-resistant Insulation Material "Penosil"

PERIODICAL: Steklo i keramika, 1959, Nr 11, pp 4-7 (USSR)

ABSTRACT: The term "penosil" is the general name for a series of foam materials which are characterised by a great thermal resistance and stability. In a French patent (see Footnote 1) the possibility of obtaining foam quartz by sintering finely crushed quartz sand in the presence of materials controlling the foaming is reported on. This process is said to take place within the temperature range of 1538-1732°. I. I. Kitaygorodskiy, in his earlier paper (Footnote 2), reported on the preparation of high-silicic porous bodies at low temperatures. The investigation of the system SiO_2-B_2O_3-Sb_2O_3 is represented in the diagram of figure 1. The qualitative characterization of the results of the briquet sintering at 1420° is given in figure 2. Furthermore, the production of the mixtures is described in detail. The thermograms of the initial components and their mixtures were recorded by means of the apparatus designed by Kurnakov. The thermal analysis was

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carried out by Engineer V. V. Pyatnitskaya (Footnote 3), and the results are given in figures 3-9. Penosil constitutes a fine-porous material with non-communicating pores. Its porosity and volume weight depend on the temperature of sintering and foaming. The mechanical strength of penosil increases with the increase of its volume weight, and its crushing strength is between 50 and 120 kg/cm^2. The curve of its thermal expansion is given in figure 10, and its average thermal capacity at various temperatures is also given. The experiments made with penosil showed that it can be used as a heat insulator. On account of its acid resistance, it can also be used in chemical industry. There are 10 figures and 2 references, 1 of which is Soviet.

PHASE I BOOK EXPLOITATION SOV/3592

Vsesoyuznoye khimicheskoye obshchestvo imeni D.I. Mendeleyeva

Silikaty; sbornik statey po khimii i tekhnologii silikatov, vyp. 1 (Silicates; Collection of Articles on the Chemistry and Production of Silicates, No. 1) Moscow, Gosstroyizdat, 1959. 105 p. Errata slip inserted. 3,000 copies printed.

Editorial Board: M.A. Matveyev (Resp. Ed.), Yu.M. Butt, and M.O. Yushkevich; Ed. of Publishing House: V.A. Rozanova; Tech. Ed.: N.I. Rudakova.

PURPOSE: This booklet is intended for chemists and geologists interested in silicate analysis.

COVERAGE: This is a collection of articles on the chemistry and technology of silicates. The contributing authors discuss the effect of admixtures on sintering processes and on the properties of Portland cements. The text also discusses the properties of certain glasses, the processing of ceramic materials, the process of drying facing tile, the stability of solid solutions of calcium

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Silicates; Collection (Cont.) SOV/3592

alumoferrite, the activation of cement, the production of aluminous cement, the preparation of pulping rolls, the interaction of quartz with lime, and various problems related to the production of silicate-calcite materials. No personalities are mentioned. References are given at the end of each article.

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AVAILABLE: Library of Congress

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15(2), 15(6)

AUTHORS: Kitaygorodskiy, I. I., Butt, L. M., Gaysinskiy, V. L., Myasnikov, K. A.

SOV/72-59-12-6/19

TITLE: The Choice of an Expedient Design for a Plant Producing Foam Glass

PERIODICAL: Steklo i keramika, 1959, Nr 12, pp 15 - 21 (USSR)

ABSTRACT: The Soviet method of producing foam glass from powders elaborated by the Kafedra stekla MKhTI imeni Mendeleyeva (Chair of Glass, MKhTI imeni Mendeleyev) found world-wide appreciation. At present, the Gomel'skiy stekol'nyy zavod (Gomel' Works) produces foam glass in the shape of blocks of various sizes in accordance with the above method. In the Institut stekla (Institute of Glass) experiments were made with the manufacture of special parts of foam glass for the insulation of pipe lines. In the USSR the production of foam glass develops slowly, a fact explained by the great production cost. The authors of the present paper, however, refuted this assumption on the basis of data supplied by the Konstantinovskiy zavod "Avtosteklo" (Konstantinovka Works "Avtosteklo"), the Ivotskiy zavod (Ivot Works) and the Gomel'skiy zavod (Gomel' Works) et al.

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The Choice of an Expedient Design for a Plant Producing Foam Glass SOV/72-59-12-6/19

In the course of the past ten years a number of various plants were designed, constructed and tested by Soviet engineers. The displacing possibilities of molds in the furnace are shown in figures 1-5. Sine 1952 experiments have been made in the USSR concerning the production of foam glass as a continuous band without molds. In 1957-1958 an automatic experimental plant AUP-1 was tested in the Gomel' Works the design of which was worked out in the Giprosteklo upon suggestions by the authors' collective L. M. Butt, M. I. Steshenko, V. L. Gaysinskiy, V. A. Il'inskiy, K. A. Myasnikov, I. S. Blagoobrazov, and L. S. Koleshko. A scheme is given in figure 6. Experiments with the above plant were made by the Gomel' Works, Giprosteklo, the Institute of Glass and its Proyektno-konstruktorskoye byuro (Planning and Design Bureau) (see Ref 1). The temperature curve of the furnace is plotted in figure 7. At present the Giprosteklo is working out the AUP-2 automatic plant. In figure 8 the scheme of a conveyer belt appliance is given which has been elaborated by I. I. Kitaygorodskiy, B.I.Borisov, L. M. Butt, and M. I. Kokon'. The Proyektno-konstruktorskoye byuro Instituta stekla (Planning and Design Bureau of the Glass

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The Choice of an Expedient Design for a Plant Producing Foam Glass SOV/72-59-12-6/19

Institute) is working out an assembly based on the foam glass formation on heat-proof steel conveyer belt. The productiveness of the establishment of departments and works for the production of foam glass may be seen from the table. In conclusion the authors consider plants producing foam glass without molds in the shape of a continuous band as the most perfect and prospective ones since they permit the automation of production processes. Until a typical industrial conveyer belt plant will be created it is recommended to build continuous type furnaces for the production of foam glass, which have stood the test. There are 8 figures and 1 table.

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KITAYGORODSKIY, I.I.; BLINOV, V.A.

Investigation of physicochemical properties of glasses containing titanium dioxide. Trudy MKHTI no.27:6-22 '59. (MIRA 15:6)
(Glass--Analysis) (Titanium oxide)

KITAYGORODSKIY, I.I.; SIL'VESTROVICH, S.I.; ELLERN, G.A.

Glasses with higher microhardness. Trudy MKHTI no.27:23-37 '59.
(MIRA 15:6)

(Glass)

KITAYGORODSKIY, I.I.; SIL'VESTROVICH, S.I.

Effect of the glassy phase on the process of sintering and properties of corundum materials. Trudy MKHTI no.27:38-64 '59. (MIRA 15:6)
(Corundum--Analysis)

KITAYGORODSKIY, I.L.; GUREVICH, TS.N.

Effect of small additives of some oxides on the strength of corundum materials. Trudy MKHTI no.27:65-72 '59. (MIRA 15:6)
(Corundum)

KITAYGORODSKIY, I.I.; GUREVICH, TS.N.

Effect of temperature of firing on the wear resistance of corundum material. Trudy MKHTI no.27:73-77 '59. (MIRA 15:6)
(Corundum)

5(1,2) SOV/20-127-2-44/70

AUTHORS: Kitaygorodskiy, I. I., Blinov, V. A.

TITLE: Production of Heatproof Glass by Enriching Glass With Silica

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 2, pp 392 - 395 (USSR)

ABSTRACT: The closer the interatomic bonds of a crystalline structure, the less the structure is capable of an expansion caused by heat (Ref 1). The ion crystals with the closest bonds have comparatively low expansion coefficients (Refs 2-4). The quartz glass which is very suitable for the production of different resistant products is too expensive since its production requires a high temperature. Therefore glass types with high silica content were necessary. The glass "Vikor" was found which is similar to the quartz glass. It contains 96% SiO_2. Vikor-glass is produced from the glass of the system SiO_2-B_2O_3-Na_2O by heating until a slight opalescence occurs. This proves apparently the formation of alkaline borates and the separation

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of the glass into 2 phases: a) silica and b) the sodium- and boron oxides soluble in mineral acids. Then the glass is rinsed in a hot mineral acid. The phase (b) is leached, and glasses with microscopical pores produced. Then the glass products are rinsed in water, dried, and heated up to 1000-1100°. Thus the pores are "fused". By this method transparent products with not porous surface and the mentioned 96% SiO_2 are produced. The glass is equivalent to melted quartz, is however, more easily to be worked in the gas burner flame than quarts. No thick-walled (more than 3 mm) products can, however, be produced from this glass. In the present paper the production method of the glass mentioned in the title is developed. First an aggressive alkali-free lead glass with low viscosity is melted: this is the difference between this and the hitherto used method. A quantity of vibro-pulverized quartz sand as high as possible (grain size 1-20μ or silicic acid gel) was additionally solved in this liquid phase with a small quantity (3%) of sodium chloride. 1) Borosilicate of the "Pyrex" type, 2) highly silica-containing glass, and 3) alkali-free lead glass (Table 1) were used as initial glasses. These glass types were pulverized

in a ball mill and 50% sand was added to each. The quartz grains do not melt in the heating up to 1660-1670°, but are gradually solved in the liquid phase (in glass). The grains are first subjected to polymorphous changes and burst. The dissolution proceeds mainly on the surface of the cracks so that the quartz grains are "etched". The glass Nr 3 (above) is best suitable for this. A series of alkali-free lead glasses were melted on the strength of the obtained results (Table 2). They had a yellow color. Table 3 shows the composition of the initial glass types and those enriched with quartz with the thermal expansion coefficient. Prescriptions are given. There are 3 tables and 4 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva (Moscow Institute of Chemical Technology imeni D. I. Mendeleyev)

PRESENTED: March 19, 1959, by I. P. Bardin, Academician
SUBMITTED: March 19, 1959

BRIKHOVSKIKH, Serafim Maksimovich; KITAYGORODSKIY, I.I., prof., doktor tekhn.nauk, nauchnyy red.; GLADYSHEVA, S.A., red.; GILLESON, P.G., tekhn.red.

[Glass abroad; manufacture and use] Steklo za rubezhom; proizvodstvo i primenenie. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1960. 287 p. (MIRA 14:3)

(Glass)

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B015/B008

15.2120

AUTHORS: Kitaygorodskiy, I. I., Professor, Doctor of Technical Sciences, Kostokinskiy, V. V.

TITLE: Manufacture of Glass Foils

PERIODICAL: Steklo i keramika, 1960, No. 7, pp. 21 - 24

TEXT: The dependence of the bending strength of glass foil on its thickness is shown in Fig. 1 according to data by the Institut stekla (Glass Institute). The Soviet scientists A. F. Ioffe, P. P. Kobeko, I. V. Kurchatov, and A. P. Aleksandrov investigated the electric strength of thin glass foils in the years 1932-1933. Investigations in the field of glass foils have greatly advanced in the USSR during the last years, as may be seen from I. I. Kitaygorodskiy's and V. A. Blinov's papers (Ref. 1). An installation for the continuous drawing of glass foils was erected at the kafedra tekhnologii stekla i steklooplastikov (Chair of Glass Technology and Glass Plastics) of the MKhTI imeni D. I. Mendeleyeva (Moskovskiy khimikotekhnologicheskiy institut imeni D. I. Mendeleyeva - Moscow Institute of Chemical Technology imeni D. I. Mendeleyev). The

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Manufacture of Glass Foils

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curves for the dependence of the thickness of the glass foils on the drawing rate, temperature, height of the level of the glass mass above the slot and on the width of the slot are shown in Figs. 2-5. The simultaneous drawing of several strips of glass foil of up to 40 mm width is shown in Fig. 6. Strips of glass foil with a width of 500 mm and a thickness of up to 10 μ are drawn at an installation of the MKhTI. Such an installation has a daily output of 1,500 kg of glass foil. There are 6 figures and 1 Soviet reference.

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BEREZHNOY A.I., kand. tekhn. nauk; KITAYGORODSKIY, I.I., doktor tekhn. nauk, zasl. deyatel' nauki i tekhniki RSFSR, prof., red.; ORLOVA, I.A., otv. red.; PEREVERZEVA, T.A., tekhn. red.

[Photosensitive glass and "Pyroceram"-type glass crystal materials] Svetochuvstvitel'nye stekla i steklokristallicheskie materialy tipa "pirokeram." Pod red. i s predisl. I.I.Kitaigorodskogo. Moskva, VINITI, 1960. 113 p. (MIRA 17:4)

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S/081/61/000/019/050/085
B110/B101

15.2620

AUTHORS: Kitaygorodskiy, I. I., Sentyurin, G. G., Yegorova, L. S.

TITLE: Synthesis of heat-resistant glasses

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1961, 309, abstract 19K256 (Sb. nauchn. tr. Belorussk. politekhn. in-t, no. 86, 1960, 38-41)

TEXT: Heat-resistant glasses were synthesized (the composition is mentioned) on the basis of the system $CaO - Al_2O_3 - SiO_2$. The ternary eutectic having a melting point of 1170°C was used as initial substance. The chemical composition of the mixture was (in % by weight): SiO_2 = 62; CaO = 23.3; Al_2O_3 = 14.7. A set of compositions was elaborated including the oxides permitting an increase in the heat resistance of the glass. The physicochemical properties of the glasses are indicated, that are recommended to manufacture heat-resistant tubes, clinkers, laboratory vessels, electro-vacuum retorts, and further products. [Abstracter's note: Complete translation.]

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KITAYGORODSKIY, I.I., prof.

Glass as a structural material. Zhur. VKHO 5 no. 2:181-185 '60. (MIRA 14:2)
(Glass construction)

KITAJGORODSZKIJ, Iszak Iljics [Kitaygorodskiy, Isak Il'ich]

History of the Soviet glass industry. Epitoanyag 12 no.6:209-216 Je '60.

06453

S/072/60/000/012/001/008
B021/B058

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AUTHORS: Kitaygorodskiy, I. I., Professor, Frolov, V. K., Kuo Cheng

TITLE: Electrical Properties of Glass of the System $V_2O_5 - V_2O_4 - P_2O_5$

PERIODICAL: Steklo i keramika, 1960, 17, No. 12, pp. 5 - 7

TEXT: The determination of the quantitative dependence of the specific electrical conductivity of vanadium glass on the content of vanadium ions of low valency is described as being important, since it is assumed that the specific electrical conductivity of glass is considerably increased when increasing the content of these ions. For the purpose of investigating this dependence, V_2O_5 in glass of the initial composition 80% V_2O_5, 20% P_2O_5, was partially reduced by means of carbon black (V_2O_4 content: 2.61 - 23.60%). M. V. Petrovykh, Candidate of Technical Sciences, participated in measurements and in the analysis of the results. The electrical

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conductivity of the samples was determined by means of the bridge YM-3 (UM-3), and the thermo-emf by means of the potentiometer ПТВ-1 (PTV-1). Results of the chemical analysis of the glass samples are mentioned in Table 1. The X-ray structural analysis was made by means of the device УРС-50И (URS-50I). The determination of the specific electrical conductivity of glass of the system V_2O_5 - V_2O_4 - P_2O_5 at a temperature of 160° is illustrated in Fig.1. In the system V_2O_5 - V_2O_4 - P_2O_5, L. A. Grechanik, V. G. Karpechenko, and N. V. Petrovykh obtained glass with a negative thermo-emf and the following chemical composition (in wt%): 22.70 V_2O_5, 38.42 V_2O_4, 38.88 P_2O_5. It results therefrom that both n-type and p-type conductivity exist simultaneously in glass of the system V_2O_5 - V_2O_4 - P_2O_5. The tendency of oxides with semiconductor properties to polymerization greatly affects the specific electrical conductivity of oxide semiconductor glass. The renewed increase of the specific electrical conductivity with an increase of the V_2O_4 content from 17.77 to 23.60% was

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Electrical Properties of Glass of the System $V_2O_5 - V_2O_4 - P_2O_5$

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ascribed to an ordering of the glass structure and to the beginning of crystallization. This is proved by an anomalous increase of the activation energy in glass with a V_2O_4 content above 19%, as well as by the X-ray structural analysis which showed the existence of a crystalline phase in glass with a content of 23.60% V_2O_4. There are 3 figures, 1 table, and 8 references: 6 Soviet, 1 US, and 1 Japanese.

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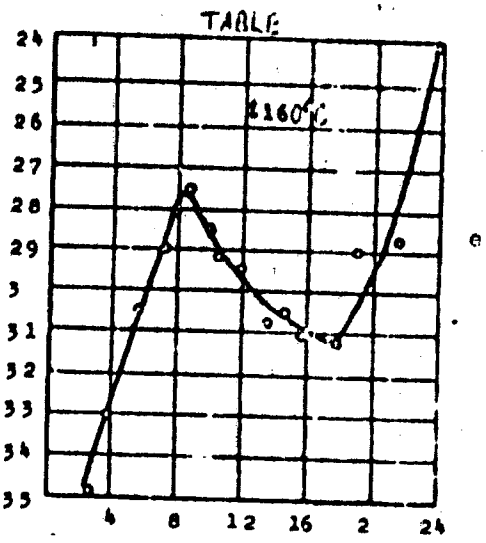
TABLE



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69875
S/032/60/026/04/06/046
B010/B006

AUTHORS: Kitaygorodskiy, I. I., Prolov, V. K.

TITLE: Oxidimetric Determinations of Vanadium Oxide in Glass

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 4, pp. 418 - 422

TEXT: Vanadium containing types of special glass can be divided into three groups - glass containing V_2O_5 and V_2O_4, glass containing V_2O_4 and V_2O_3, and glass containing V_2O_3 and VO. Oxidimetric methods for the determination of the two first-mentioned types of glass were developed. The vanadium oxides are dissolved by treatment with sulfuric- and phosphoric acids, and 48% sulfuric acid (the latter for V_2O_5) (Table 1, solubilities of vanadium oxides). It was found that oxidimetric determinations of V_2O_3 and VO in glass of the third type are not possible. This is due to the instability of VO in acid solutions. Before analyzing the glass, its type must be determined, i.e. if addition of phenylanthranilic acid to the glass solution produces a red-violet color, the glass belongs to the first type, if however, the glass solution is blue from the out-

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Oxidimetric Determinations of Vanadium Oxide in Glass S/032/60/026/04/06/046
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set, the glass belongs to the second type, while solutions of the third type of glass are green. The oxidimetric determination of V_2O_5 and V_2O_4 (first glass type) can be carried out in two modified forms: either (after corresponding pre-treatment), V_2O_4 is titrated with 0.05N $KMnO_4$ solution, and then (after addition of phosphoric acid), V_2O_5 with 0.05N Mohr's salt solution using phenylanthranilic acid as indicator, or V_2O_5 is titrated before V_2O_4 (2nd modification). The procedure is described. In the case of the second glass type, V_2O_4 is also titrated with $KMnO_4$ solution, and V_2O_3 with Mohr's salt solution, but a special method must be employed, since part of the V_2O_3 does not dissolve (or only partly, together with V_2O_4). Glass of this type can only be analyzed if its Fe^{2+} content is low. The method described was tested by using silicate- and vanadium phosphate semiconductor glasses (Table 2, composition). The relative error of the method was 0.3% (Table 3). Publications by A. I. Tsvetkov (Ref. 3), V. I. Smirnova and B. F. Ormont (Ref. 4), and M. A. Gurevich are mentioned in the paper. There are 3 tables and 5 Soviet references.

Card 2/3 Moscow Inst. of Chem. Technology im D. I. Mendeleyev

15.2120

5(1)

AUTHORS: Kitaygorodskiy, I.I., Artamonova, N.V. 307/20-130-2-38/69

TITLE: "Penosil", a New Thermoinsulating Material Resistant to Heat

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 377-378 (USSR)

ABSTRACT: In 1957, the authors developed a new foam material of high resistance to heat and temperature stability. The material is prepared by simultaneous synthesis and foam formation of glass with high SiO_2 content. The resulting series of new foam-glass types was called P e n o s i l. They contain 90-94% of SiO_2 and 10-6% of flux and gas-forming substance. The silica mixtures were prepared from anhydrous silicic acid (main component), boric acid (flux) and antimony trioxide (foam-forming agent). The technical procedure comprises the following operations: (1) Crushing of components on a vibration mill, mixing and formation of a large specific surface of about 30,000 cm^2/g. This favors the sintering of the mixture and the formation of the liquid phase at lower temperatures. (2) Dry pressing of slabs and briquettes. (3) Sintering and foam formation in an electric high-temperature furnace on heat-conducting ceramic

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BLOKH, G.S., kand. tekhn. nauk; CHERNYAK, Ya.N., kand. tekhn. nauk; BALKEVICH, V.L., kand. tekhn. nauk; GAK, B.N., kand. tekhn. nauk; KORDONSKAYA, R.K., kand. tekhn. nauk; REMPEL', A.M., kand. tekhn. nauk; ZHUKOV, D.V., nauchnyy red.; YUSHKEVICH, M.O., red. toma; SKRAMTAYEV, B.G., glav. red.; BALAT'YEV, P.K., red.; KITAYEV, Ye.N., red.; MATAYGORODSKIY, I.I., red.; KRZHEMINSKIY, S.A., red.; ROKHLIN, Ye.L., red.; KHOLIN, I.I., red.; GURVICH, E.A., red. izd-va; SHERSTNEVA, N.V., tekhn. red.

[Handbook on the manufacture of structural ceramics] Spravochnik po proizvodstvu stroitel'noi keramiki. Moskva, Gos. izd-vo lit-ry po stroit., arkhit. i stroit. materialam. Vol.1. [General information and production control] Obshchie svedeniia i kontrol' proizvodstva. Pod red. M.O.IUshkevicha. 1961. 464 p. (MIRA 15:2)
(Ceramics) (Building materials)

KITAYGORODSKIY, I.I., doktor tekhn. nauk, prof.; KACHALOV, N.N., prof.; VARGIN, V.V., doktor tekhn. nauk, prof.; YEVSTROP'YEV, K.S., doktor tekhn. nauk, prof.; GINZBURG, D.B., doktor tekhn. nauk, prof.; ASLANOVA, M.S., doktor tekhn. nauk, prof.; GURFINKEL', I.Ye., inzh.; ZAK, A.P., kand. tekhn. nauk; KOTLYAR, A.Ye., inzh.; PAVLUSHKIN, N.M., doktor tekhn. nauk, prof.; SENTYURIN, G.G., kand. tekhn. nauk; SIL'VESTROVICH, S.I., kand. tekhn. nauk, dots.; SOLINOV, F.G., kand. tekhn. nauk; SOLOMIN, N.V., doktor tekhn. nauk, prof.; TEMKIN, B.S., kand. tekhn. nauk; GLADYSHEVA, S.A., red. izd-va; TEMKINA, Ye.L., tekhn. red.

[Glass technology] Tekhnologiia stekla. Izd.3., perer. Moskva, Gos. izd-vo lit-ry po stroit., arkhit. i stroit. materialam, 1961. 622 p. (MIRA 14:10)

1. Chlen-korrespondent AN SSSR (for Kachalov).
(Glass manufacture)

15.2610

31611
S/063/61/006/006/004/006
A057/A126

AUTHORS: Kitaygorodskiy, I. I., Professor, Sil'vestrovich, S. I., Candidate of Technical Sciences

TITLE: The problem of increasing strength and heat resistance of glass

PERIODICAL: Zhurnal vsesoyuznogo khimicheskogo obshchestva imeni D. I. Mendeleyeva, v. 6, no. 6, 1961, 635 - 642

TEXT: A discussion on the improvement of glass properties is presented with a review of corresponding literature and some experimental results of the present authors and others. First were discussed glass properties in general, and then existing methods for the improvement of the strength and heat resistance of glass. The practical strength of glasses is effected by several factors, which have to be considered separately, i. e.: 1) the characteristic high brittleness; 2) the non-oriented and heterogeneous structure, and 3) the formation of defects on the glass surface during production and use. Various authors demonstrated that the brittle rupture of glass occurs in two stages (first slow, second quick) caused by the formation of fissures forming so-called "steps" of brittle rupture. In a series of investigations there was proved the existence of a micro-heterogeneous

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The problem of increasing strength and...

structure of glasses, which is mainly influenced by the chemical nature and the conditions of thermal treatment ("thermal past") of the glass. This effect is discussed in the paper by O. O. Sentyurin (this journal, v. 6, no. 6, 1961, 643). The structural micro-heterogeneity is specified by the type of structural links and the chain skeleton of the glass. Heterogeneities in glasses can also be effected by technological processes; defects in the glass surface are of great importance. Also characteristic for glasses is the definite effect of the scale factor on strength and thermal stability. Observations made by N. K. Dertev [Ref. 39: Some mechanical properties of glass surface layer, Dissertation, Institut khimii silikatov AN SSSR (Institute of Silicate Chemistry AS USSR), L., 1952] revealed that this effect varies with the chemical composition of the glass, proving thus conclusions on the influence of the chemical composition on type and degree of structural micro-heterogeneities and surface defects. The present authors suggest the following trends for the improvement of glass properties: 1) Further improvement of the nature of the glass, 2) strengthening of the surface of industrial glasses, and 3) development of new technological principles and methods for the manufacture of tough and heat resistant industrial glasses. Evidently the influence of the chemical composition can be developed in some cases directly, in others indirectly, and

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sometimes it is covered by the effect of other factors. Investigations of the present authors [Ref. 49: Trudy MKhTI im. D. I. Mendeleyeva, v. 27, 1959] showed, for instance, a definite effect of the chemical composition of the glass on its microhardness. The possibility of improving the strength and heat resistance of glass by changing the chemical composition is also proved by results obtained by I. I. Kitaygorodskiy et al. [Ref. 49: Trudy MKhTI im. D. I. Mendeleyeva, v. 27, 1959; Ref. 51: Steklo i keramika, no. 7 (1958); Ref. 53: DAN SSSR, 118, no. 2 (1958)], S. K. Dubrovo, and Yu. A. Shmidt [Ref. 50: ZhPKh, 30, no. 4 (1957)], I. D. Tykachinskiy et al. [Ref. 52: Steklo i keramika, no. 6 (1956)], K. T. Bondarev et al. [Ref. 54: ibid no. 4 (1960)], and M. A. Matveyev, and I. N. Semenov [Ref. 55: ibid no. 9 (1958)] with chemical laboratory glasses of the typeKC-16 (KS-16), KC-18 (KS-18), glass with increased microhardness, glass for tubes and insulators type 13-B (13-v) and other special glasses. For the strengthening of the glass surface some original methods were developed by S. M. Brekhovskikh [Ref. 56: Steklo i keramika, no. 7 (1960); Ref. 57: Steklo, Byulleten' in-ta stekla, no. 1 (1951)] and S. I. Sil'vestrovich, and I. A. Boguslovskiy [Ref. 58: DAN SSSR, 129, no. 6 (1959), Steklo i keramika, no. 1 (1960)]. Most developed are at present thermal, chemical, and thermo-chemical methods of glass surface strengthening. A method of thermochemical treatment of the glass surface with silico-organic compounds was

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developed at the kafedra tekhnologii stekla i stekloplastikov MKhTI im. D. I. Mendeleyeva (Department of Technology for Glass and Glassreinforced Plastics "Moscow Order of Lenin" Institute of Chemical Technology imeni D. I. Mendeleyev). This method was also used by I. A. Boguslavskiy [Ref. 69: Steklo i keramika, no. 9 (1960)] to increase the heat resistance of industrial glass. There are 71 references: 48 Soviet-bloc and 23 non-Soviet-bloc. The references to the 4 most recent English-language publications read as follows: W. Thomas, Phys. a. Chem. Glasses (U. K.), 1960; I. Warshaw, J. Am. Ceram. Soc., 1960; R. Mould, J. Am. Ceram. Soc., 1960; F. Ernsberger, Phys. a. Chem. Glasses, no. 1 (1960).

89748

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B105/B206

15.2120

AUTHORS: Kitaygorodskiy, I. I., Professor, Rostokinskiy, V. V., Yelinek, V. I.

TITLE: Method of determining tear and elasticity of glass foils

PERIODICAL: Steklo i keramika, 18 no. 3, 1961, 8-11

TEXT: A method of continuous drawing of glass foils to a thickness of 1 μ and less was elaborated and introduced at the kafedra tekhnologii stekla (Department of Glass Technology) of the Moskovskiy khimiko-tekhnologicheskiy institut imeni D. I. Mendeleyeva (Moscow Chemical and Technological Institute imeni D. I. Mendeleyev). In this paper, the authors mention the first results of studies on elaborating the determination method of some physical properties of glass foils, i.e., tear and elasticity. Glass foils were tested for bending by means of compressed air, the diameters of the inserted foils being 10, 15, 20, and 30 mm. The pressure was measured with an accuracy of ±0.02 atm, the bending with an accuracy of ±2μ. The spread of values of rupture

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Method of determining tear and elasticity...

pressures P and bendings f for foils of window glass of 25μ thickness and 20 mm diameter is characterized by the distribution curves $\varrho(P)$ and $\varrho(f)$ (Figs. 2,3). The values for drawing up these diagrams were determined by the following formulas: $\varrho(P) = \frac{1}{N}\left(\frac{\Delta N}{\Delta P}\right)$, $\varrho(P)$ being the distribution function; N the number of tests (in this case 75); ΔN the number of tests with results within the interval of pressures from P up to $P+\Delta P$; ΔP the selected interval of pressures (in this case 0.4 atm). The tests with glass foils were made with glass of two different compositions (aluminum-magnesium glass (1) and aluminum-calcium glass (2)). The dependence of bending on pressure was compared with similar values for foils of mica, cellophane and insulation paper of the same thickness (Fig. 4). The dependence of the reduced rupture pressure on the thickness of foils is shown in Fig. 5 for glasses No. 1 and No. 2. The tear resistance $\sigma_{o\ max}$ of the thin elastic plates which are rigidly clamped can be calculated by means of formula 2: $\sigma_{o\ max} = 0.423\sqrt[3]{E\left(\frac{P \cdot a}{h}\right)^2}$, E being Young's modulus

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Method of determining tear and elasticity...

in atm; h the thickness of the plate (foil) in cm; a the clamping radius of the plate in cm; P the pressure in atm; $\sigma_{o\ max}$ the maximum stress in the center in atm. Observations showed that glass foils broke in the center. Young's modulus is determined according to the formula by Ye. P. Pichugin: $E = \sum E_i m_i$, E_i being Young's modulus for every oxide present in the glass; m_i the mole fraction of each component. The congruence of the calculated values of the rupture stresses σ_{rupt}, which were determined for various diameters of the clamped round samples, is described as being satisfactory (Table 2). The calculated dependence of the tear resistance of glass foils on their thickness is shown in Fig. 7 for glasses no. 1 and no. 2. The authors finally state that they have elaborated a method of determining the rupture pressure and rupture flexure of rigidly clamped glass foils, which allows to make a comparative estimation of their mechanical properties; comparative determinations of rupture pressure and rupture flexure of foils of various thicknesses were made for two glass compositions; the applicability of formula 2 was shown for an approximate estimation of the strength of glass foils, and it was stated that the strength of glass foils increased rapidly at a reduction of their

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thickness, starting from about 100μ. There are 7 figures, 2 tables, and 2 Soviet-bloc references.

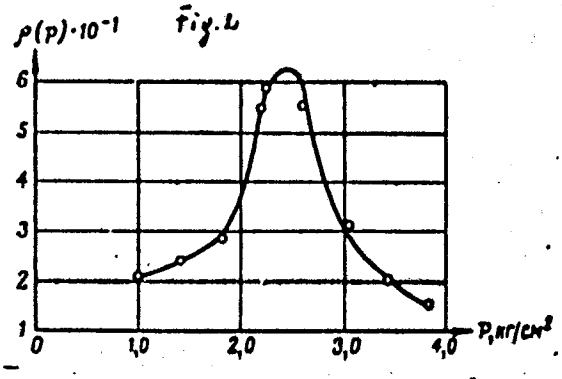

Fig. 2

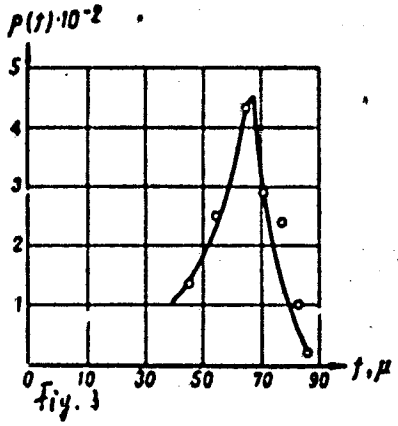

Fig. 3

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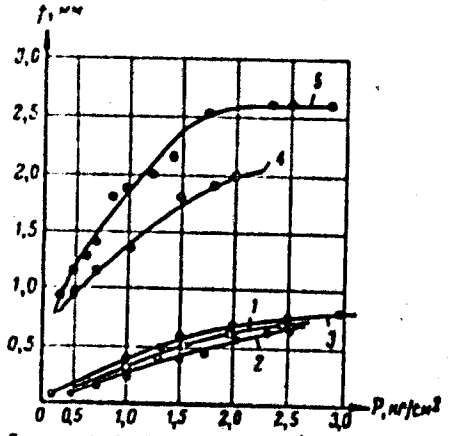
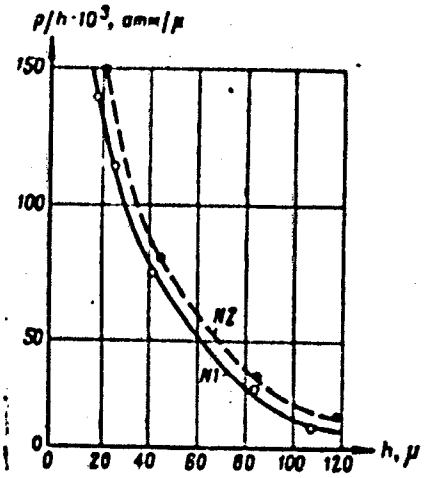


Legend to Fig. 4: 1) glass No. 1, thickness 25μ; 2) glass No. 2, thickness 25μ; 3) mica muscovite, thickness 25μ; 4) insulation paper, thickness 30μ; 5) cellophane, thickness 30μ.



Legend to Fig. 5: N1 - glass No. 1, N2 - glass No. 2.

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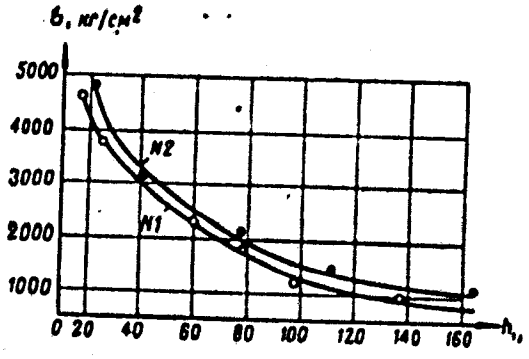
Method of determining tear and elasticity...

Legend to Fig. 7:
N1 - glass No. 1, N2 - glass No. 2.



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